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THE CORPS WORK FORCE IN TRANSITION.(U)
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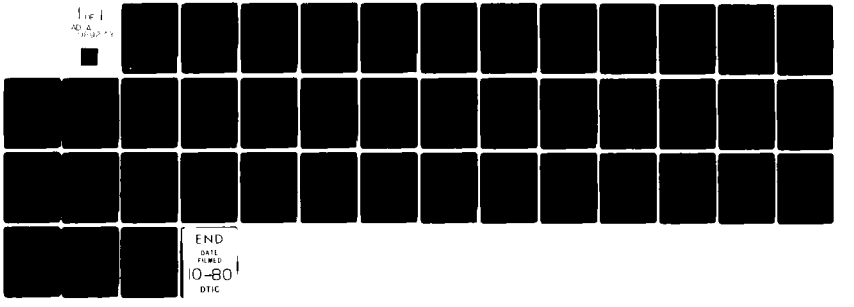

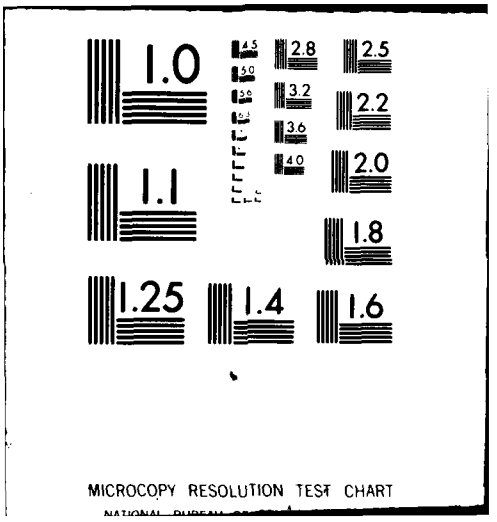
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THE CORPS WORK FORCE IN TRANSITION

Prepared by
US Army Engineer Studies Center
Corps of Engineers

JUL 1980

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This report presents the findings of a demographic analysis of the Corps of Engineers work force and evaluates the implications of these findings for the future. It includes an overall description of the work force by age, grade, and pay plan categories. It also addresses advancement opportunities as perceived by employees in selected occupational series and highlights management implications.

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Prepared by
US Army Engineer Studies Center
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July 1980

Principal Author: CPT Jonathan S. Thompson

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CONTENTS

THE CORPS WORK FORCE IN TRANSITION

I. INTRODUCTION

1. Purpose and Scope. This monograph reports findings of a demographic analysis of the Corps of Engineers work force and evaluates implications of these findings for the future. It includes an overall description of the work force by age, grade, and pay plan categories. The paper presents a snapshot of the Corps grade structure, discusses advancement opportunities as perceived by employees in selected occupational series, and highlights management implications.

2. Background.

a. The Developing and Managing the Corps Work Force for Future Missions study.[1/] Subsequent to the October 1977 Division Engineers (DE) Conference, the Engineer Studies Center (ESC) initiated the study. With an overall study purpose of facilitating work force aspects of planning for the 1980's, it was necessary to analyze Corps future work force needs and to identify specific actions which can be taken to enhance the Corps' capability to meet these future needs. A logical part of that study was the task of developing a profile of the current work force and analyzing relevant implications. This monograph presents the results of that related analysis.

b. The Civil Service Reform Act (CSRA) of 1978. Congress passed the CSRA during the preparation of this monograph. The Corps perceived this legislation as a singular opportunity to improve its effectiveness and

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1/ Department of the Army, Office of the Chief of Engineers, United States Army Engineer Studies Center, Developing and Managing the Corps Work Force for Future Missions. Washington, D. C., July 1980.

productivity.[2/] The Senior Executive Service (SES), merit pay, and new performance appraisal requirements are major elements of the Act which are aimed at improving government personnel management. Implementation will require accurate and timely information on the work force to aid managers and supervisors in decision making. Data were accumulated for this monograph prior to implementation of CSRA, and relevant pay grades within the SES are presented in terms of General Schedule (GS) grades.

2/ Department of the Army, Office of the Chief of Engineers, United States Army Engineer Studies Center, Management Implications of the Civil Service Reform Act (CSRA). Washington, D. C., September 1979.

II. COMPOSITION OF THE CORPS WORK FORCE

3. Size. The size of the Corps work force fluctuates due to normal turnover and a variety of seasonal hiring programs. In order to determine the actual composition of the Corps, it was necessary to supplement data obtained from the Resource Management Office (RMO), Office of the Chief of Engineers (OCE) with data retrieved directly from the Civilian Personnel Center's Civilian Personnel Management Information System (CIVPERSINS) tape.[3/] Figure 1 shows that the CIVPERSINS tape reflects a Corps strength exceeding that authorized, while Corps functional reports reflect the opposite. The majority of the discrepancy is accounted for by the cumulative lag times incurred in maintaining and updating files and also by the selective compilation of the Command Strength Report (Deputy Chief of Staff for Personnel (DCSPER) Form 322).[4/] Except where noted, the demographic profile presented in this monograph is extracted from the most complete single source available--the CIVPERSINS tape.

4. Overall Breakdown by Age, Race, and Sex. To fully categorize the composition of the Corps, it was necessary to identify certain components of Corps population. Figure 2 shows a comparison of US and Corps population by age. The bulk of the contributing work force (ages 30 to 55) mirrors the

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3/ Data were accumulated in March 1979 to avoid summer hire fluctuations.

4/ This report is extracted from CIVPERSINS by ODCSPER and used by the OCE RMO. The report apparently does not include selected personnel in excepted service positions nor parts or all of selected units. Note also that the Department of the Army, Civilian Personnel Center, CSGPA-1103, CIVPERSINS Profile Report, January-March 1979, shows over 46,000 permanent and temporary Corps positions under the position tenure code which indicates current position status without regard to the personal status of the incumbent employee.

general shape of the US population. Approximately three-fourths of the personnel are male and nearly 85 percent are Caucasian. These percentages are almost uniformly represented in each age group. While there are exceptions, the average age-to-grade pattern displayed by the higher levels of the Corps is stable and predictable (see Figure 3).

SIZE OF THE CORPS

Category	CIVPERSINS Tape[a]	Category	RMO[b] Authorized	RMO[b] Actual
GS	33,715	Civilian	32,928	31,602
Wage Board (WB)	9,020	Military	10,468	10,417
Other	2,617		--	--
	45,352		43,396	42,019

a/ Source: March 1979 CIVPERSINS tape (excludes special programs, GS-0).

b/ Source: Department of the Army, Office of the Chief of Engineers, Resource Management Office, Manpower Programs Allocation and Utilization Branch, Manpower Status 31 Mar 79. Washington, D.C., 1979.

Figure 1

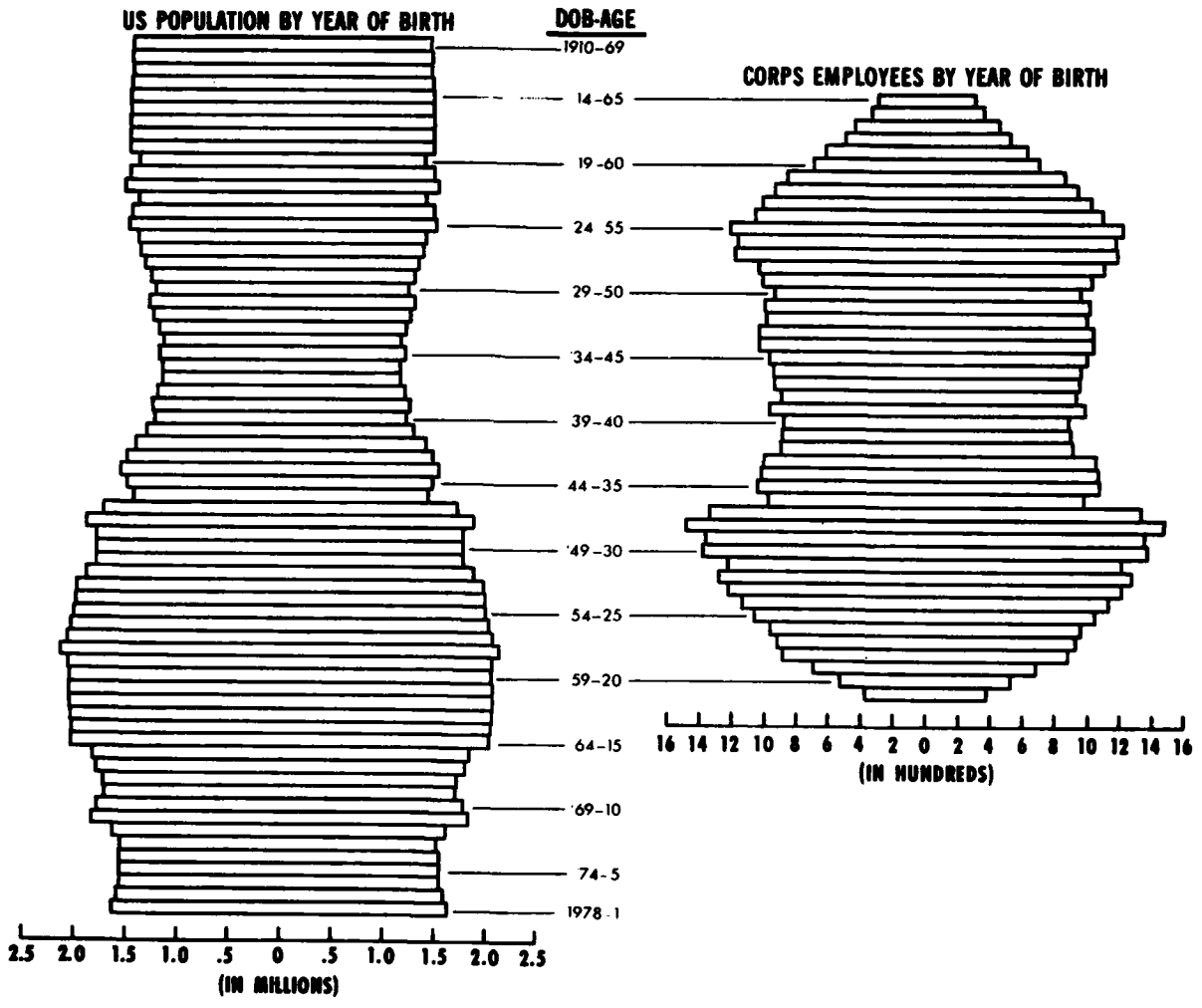

COMPARISON OF US AND CORPS POPULATIONS BY AGE
US POPULATION BY YEAR OF BIRTH
DOB-AGE
1910-69
14-65
19-60
24 55
29-50
34-45
39-40
44-35
49-30
54-25
59-20
64-15
69-10
74-5
1978-1
2.5 2.0 1.5 1.0 .5 0 .5 1.0 1.5 2.0 2.5
(IN MILLIONS)
CORPS EMPLOYEES BY YEAR OF BIRTH
16 14 12 10 8 6 4 2 0 2 4 6 8 10 12 14 16
(IN HUNDREDS)

Figure 2

AVERAGE AGE TO GRADE PATTERN

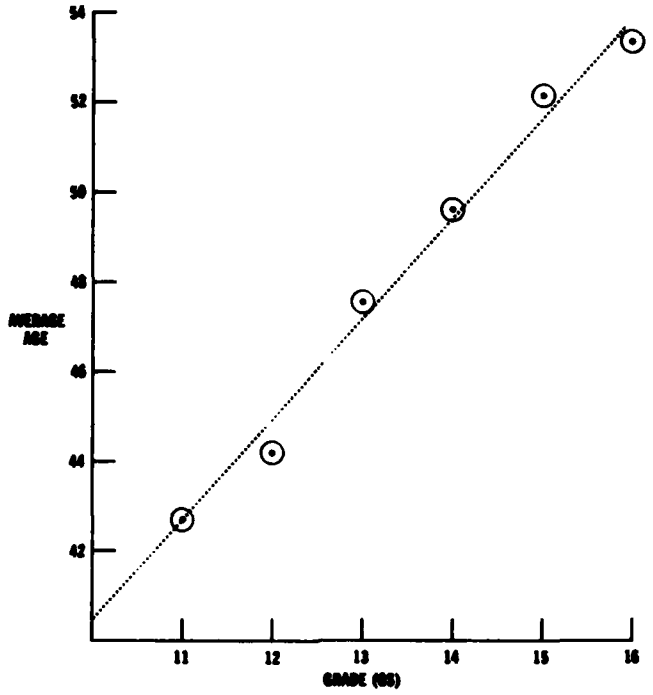
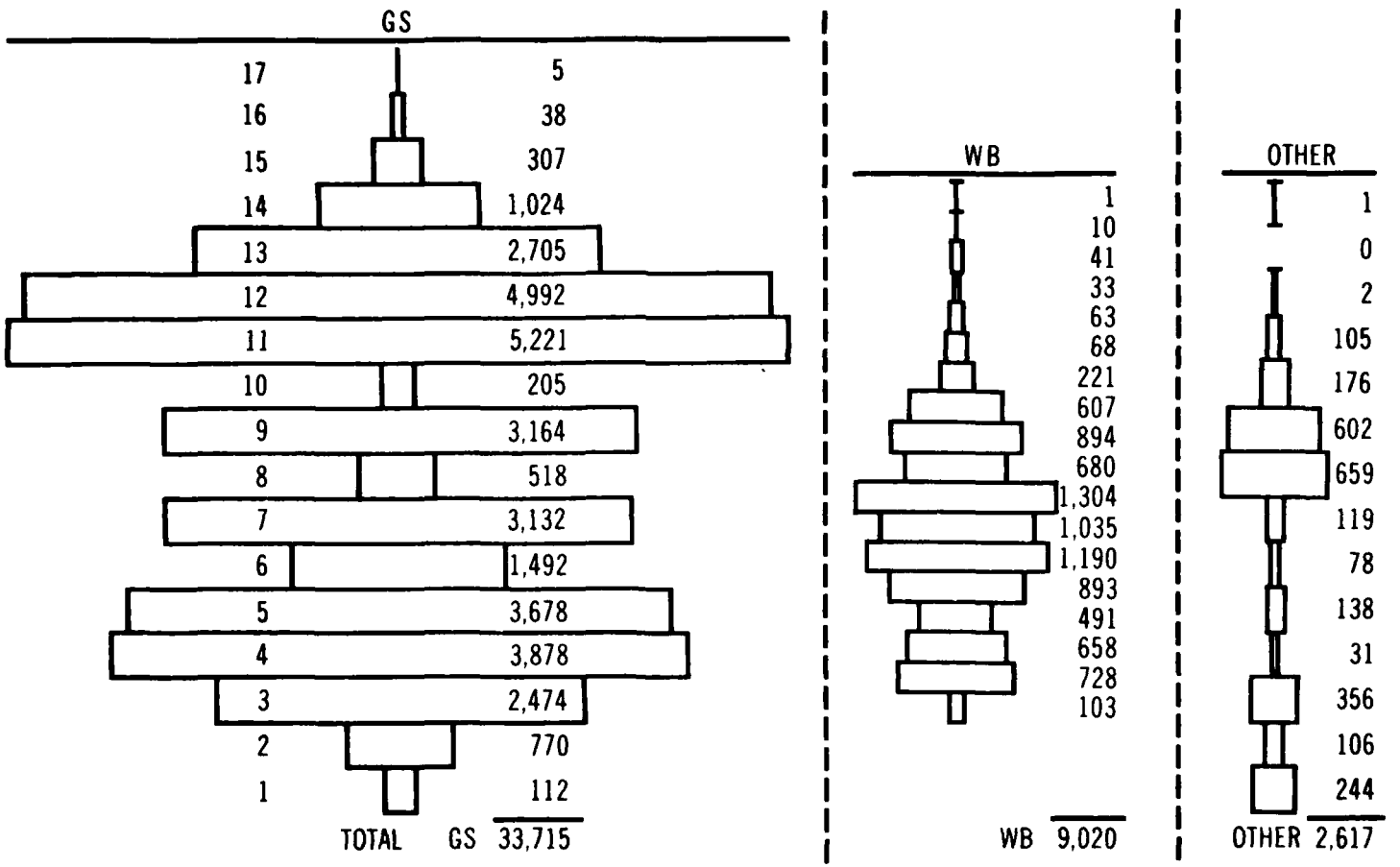


Figure 3

5. Grade Structure. Figure 4 shows the distribution of the Corps work force by grade structure for GS, WB, and other pay plans. Approximately three-fourths of the Corps employees are in the GS plan and the remainder are under WB or other categories.

6. Composition of Selected Occupational Series. The Corps has many occupational series comprising its professional work force both within and outside the engineer and scientist career program. Annex A provides a breakdown by grade (GS-5, 7, 9, and 11 through 16) of selected occupational series which were found to be of interest during the main study. The 12,471

TOTAL CORPS GRADE STRUCTURE (BY PAY PLAN EQUIVALENTS)



CORPS TOTAL 45,352

Figure 4

employees in these series are referred to in this analysis as the "professional" work force (see Figure A-10). The selection process involved reviewing all occupational series and studying in-depth only those believed to be most critical for specific management attention in the future or as illustrative of current trends or capabilities.

a. Capability contradictions. The data revealed some surprising and seemingly contradictory situations for such a large and preeminent engineering organization. Considering the impact of the Corps in soils engineering and conservation, it is surprising to find only 14 people in that series (predominantly employed by Corps laboratories). Similarly, the Corps employs 3 people in the environmental engineering series, 1 in mining, 2 in agriculture, 7 in chemical, 57 in hydrology, and 31 in ecology. In an organization with over 40,000 personnel, these numbers appear to be unusually small and tend to incorrectly reflect to outside observers the Corps' commitment in these areas.

b. Secondary skills. The disconcertingly low number of Corps employees in these career series does not accurately reflect the true Corps capability. The composition portrayed in Annex A must be judiciously reviewed because arrayment by a single characteristic (occupational series) does not reflect additional training and skills nor provide a complete picture of Corps summary capabilities. For example, in the hydrology series there are only 57 people listed. Yet, the Stratification of Corps personnel (CORPSTRAT) by functional classification shows over 1,100 people actually used in the hydrologic fields. Even this does not reflect the total number qualified to work in these areas as there is no way to determine how many have progressed through these positions into other fields and yet retain their hydrologic

skills. There are similar contradictions in other areas, such as in the environmental series, where there are approximately 800 people actually employed. The Corps meets demand in the hydrologic area by retraining civil engineers through the Hydrologic Engineering Center (HEC) in Davis, California. This process requires training and utilization tours extending over several years. By and large, those who receive such "additional" training entered the Corps as civil engineers and resist any alteration of their occupational series in order to preserve their perceived promotion prerequisites.5/ Furthermore, under-representation in certain occupational series is frequently slighted by reference to the Corps' capability to "contract out" work, thus obviating some requirements for expertise. And, even here it is difficult to ascertain true capability. While the Corps has only 2 people in the "contract representative" occupational series, a significant number of people (400+) are adjacently used in the procurement and contract series and others are performing similar duties while retaining their original occupational series. This is similar to the hundreds of civil engineers fulfilling program management functions while the Corps formally employs no one in the program management occupational series. These skills represent a capability possessed by the Corps which is not readily discernible merely by examining recorded occupational series or any other single parameter. This situation demonstrably

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5/ Corps employees perceive retention of civil engineer status as necessary for referral to upper level Corps positions because of the way the Skills, Knowledge, Abilities, and Personal (SKAP) characteristics portion of the Office of Personnel Management's CPR 950-18, Army Civilian Career Program for Engineers and Scientists, April 1965 with Change 1 dated 10 October 1975, controls referral selections.

reinforces the need for a viable management information system (MIS) based on a decision analysis of Corps operations.

c. Perceived advancement opportunities. It is important to consider Corps composition from the point of view of perceived advancement opportunities in individual disciplines. This is especially true in light of the inconsistencies disclosed by comparing Corps personnel occupational series and personnel utilization as reflected by CORPSTRAT. Civil engineer is the largest single occupational series among the senior levels of the Corps (see Annex A). An organization displaying an image that is dominated by a single career discipline can expect this to play a large role in recruitment and also in the retention of prospective employees. Figure 5 illustrates this point by showing a comparison of advancement made by civil, electrical, mechanical, and industrial engineers. It shows the number of employees in a series at a specific grade compared to the total number of Corps employees in the series. For instance, 1 in 3 civil engineers are GS-13s but only 1 in 3,000 (approximately) made GS-17. The entry is null if no one in the series is in the grade. As can be seen, there is a basis for the perception that only those engineers in the civil occupational series have a reasonable chance of progressing in grade to level 16 or above. The mechanical and electrical series have the best representation (two made GS-15) among the non-civil engineering disciplines. The same subordinate relationship is demonstrated by virtually all other professional series when compared to the civil engineers in general.

ENGINEER ADVANCEMENT COMPARISON

Engineering Series	Ratio per Grade				
	GS-13	GS-14	GS-15	GS-16	GS-17
Civil	1:3	1:7	1:27	1:300	1:3,000
Electrical	1:4	1:18	1:300	--	--
Mechanical	1:4	1:18	1:300	--	--
Industrial	1:3	--	--	--	--

Figure 5

d. Information system observations. The actual composition of the Corps is more distorted than the current functional information systems report. The Corps stresses decentralized management and, as a result, has a fragmented MIS at the corporate level. The functional accountability problem is somewhat exacerbated by the tendency to regard COEMIS-PA[6/] (from which the CORPSTRAT data are derived) as a complete accounting of personnel, which it is not.[7/] The COEMIS-PA subsystem is primarily CONUS oriented and provides extensive and detailed information on Corps personnel (not found on CIVPERSINS or similar systems like SCIPMIS[8/]). This makes it a valuable lower level management tool. In fact, the system would be well on the way to becoming a

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6/ Corps of Engineers Management Information System-Personnel Administration.

7/ Note the anomaly: CORPSTRAT is promoted for "functional" accountability, but OCE relies on DCSPER's CIVPERSINS extract for manpower data, tacitly acknowledging CORPSTRATS' impracticality and the lack of a functioning corporate-level MIS in the Corps.

8/ Standard Civilian Personnel Management Information System (Army System).

personnel administration system which corporate-level management could use with a reasonable degree of confidence if it encompassed the entire Corps and balanced occupational series against job functions for Corps personnel. There is a definite requirement for a corporate-level MIS in the Corps.

III. CHANGE IN THE CORPS

7. Personnel Turnover. In evaluating normal annual turnover in the Corps, the number of personnel eligible for retirement was the most explicit, and therefore the most definitive measure. Retirement eligibility was found to be a valuable tool for turnover extrapolation. Historically, it was found that in any given year, approximately 26 percent of those eligible to retire did retire and that retirements accounted for a constant 25 percent, approximately, of total annual turnover.9/ Therefore, the total number becoming eligible to retire within a year provides a reasonable approximation of total annual turnover. Figure 6 is a summary of Corps GS employees eligible to retire by 1984. The figure shows that openings expected in the higher grade levels (and the apprentice levels feeding into them) are not inordinate, but that the percentages of vacancies increase with the upper grades. Figure 7 is a refinement of this picture including only the scientist, engineer, and professional work force identified in Annex A along with a further refinement showing only civil engineers.

8. Higher Grade Turnover. While the turnover figures do not appear inordinate, they must be investigated in the context of cumulative demand to replace total system losses. Figure 8 shows the results of this investigation. Promotions are shown as filled from within and no laterals are considered. The 1-year demand generated by losses in any given level can normally

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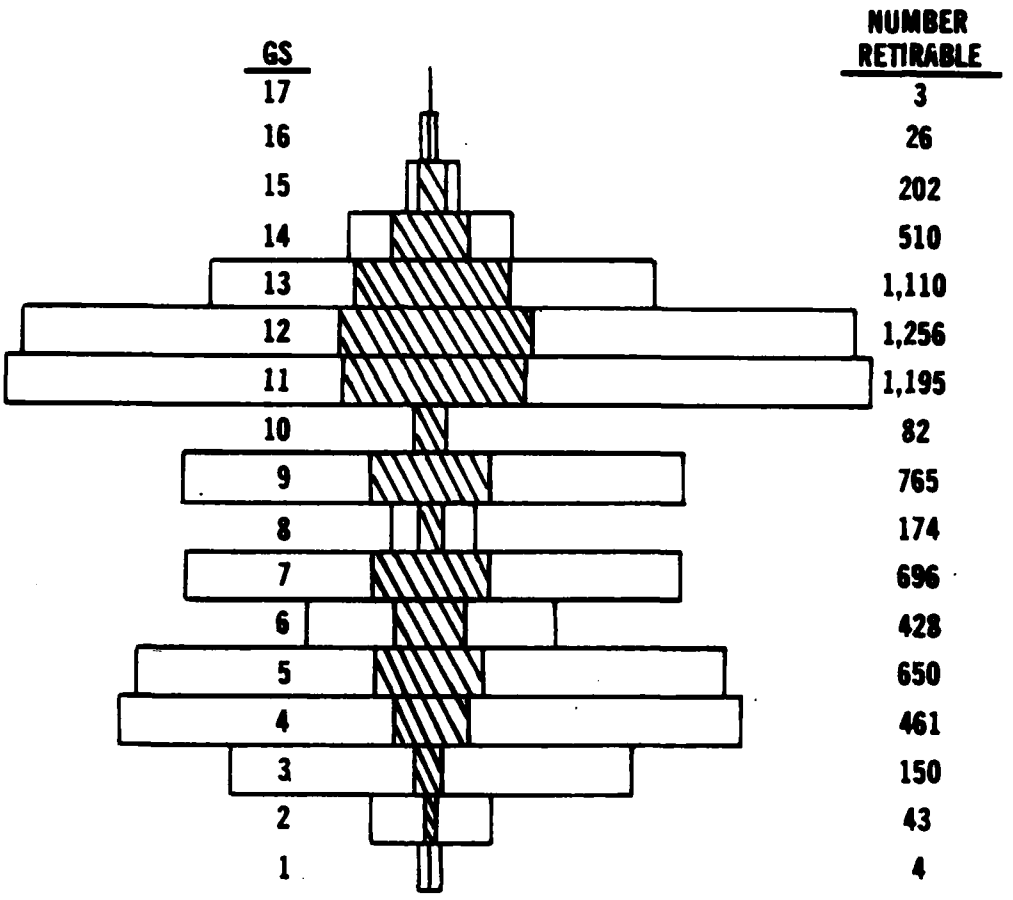
9/ As recorded in OCE RMO historical documents: ENG Form 4642-R, Data on Engineer Workforce; ENG Form 2623, Data on Engineer Employment; and the Department of Defense, Defense Intelligence Agency's DIA Review and Analysis of General Intelligence Career Development Program Annual Status Report for 1978.

CORPS GS EMPLOYEES RETIRABLE BY 1984



POTENTIAL OPENINGS 1979 THRU 1984

ALL GRADES	7,755	23%
GS 11-17	4,302	30%

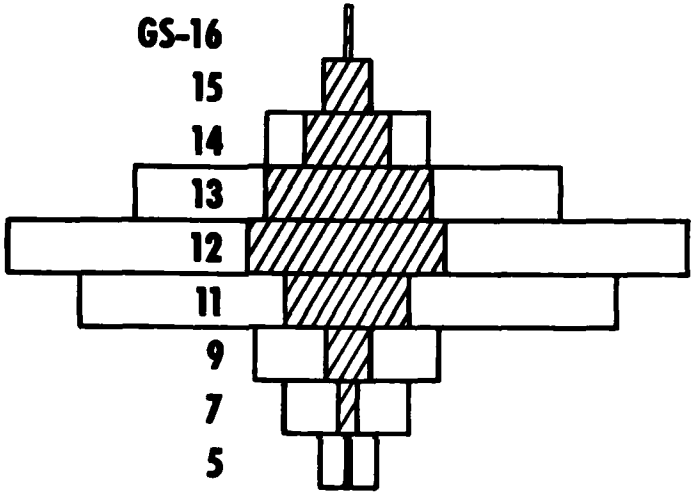
RETIRABLE

Figure 6

SELECTED GS EMPLOYEES RETIRABLE BY 1984

SCIENTIST, ENGINEER, and OTHER PROFESSIONALS

MAR 79 STRENGTH		RETIRABLE BY 1984	
28	GS-16	25	
275	15	184	
902	14	468	
2,342	13	959	
3,844	12	1,104	
3,068	11	688	
1,028	9	225	
677	7	70	
307	5	12	
12,471		3,735	30%



CIVIL ENGINEERS

18	GS-16	16	
188	15	122	
589	14	287	
1,491	13	521	
2,260	12	550	
1,503	11	230	
353	9	16	
342	7	10	
131	5	2	
6,875		1,754	26%

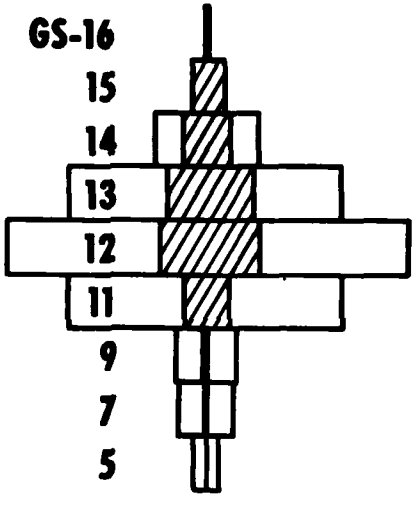
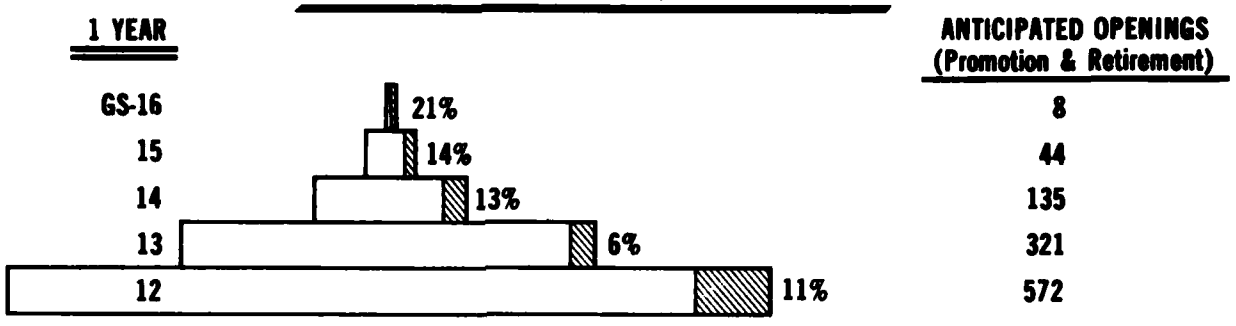
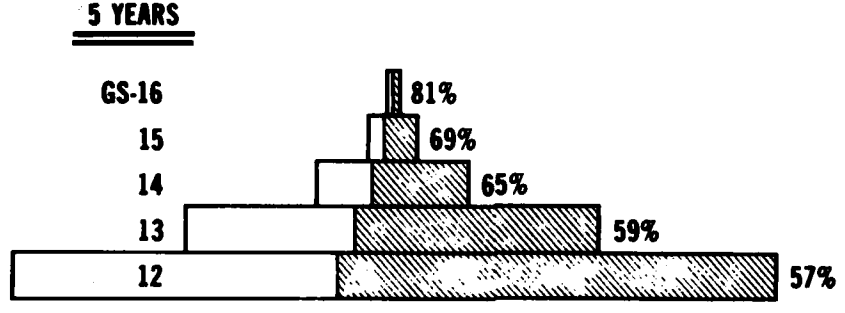


Figure 7

TOTAL CORPS HIGHER GRADE TURNOVER
(No Laterals)



- LOW TO MODERATE EXPECTED ANNUAL TURNOVER
- CAN BE FILLED BY TOP 10% OF NEXT LOWER GRADES



- LARGE CUMULATIVE IMPACT
- SIGNIFICANT PROFESSIONAL DEVELOPMENT REQUIREMENT

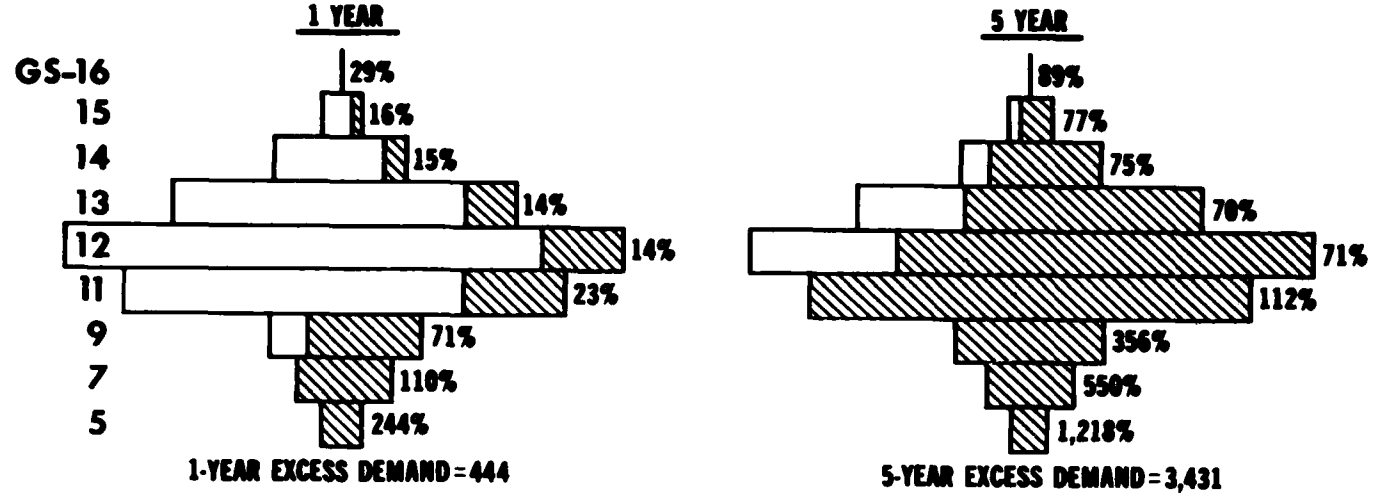
Figure 8

be satisfied by selecting from among the top 10 percent of the next level below it. But, as can also be seen, there is a large cumulative turnover impact over a 5-year period. This relatively large turnover has widespread management implications and presents significant opportunities for improving organizational effectiveness. Competent human resource management is perhaps the most crucial factor leading to effective organizational performance, and naturally occurring opportunities to control replacement and promotion in the upper grades are especially significant.

9. Replacement of Personnel. Continuing this line of investigation to grades below GS-12 reveals additional information. Figure 9 shows cumulative turnover for all GS personnel listed in Annex A and also for civil engineers only. The figure shows all promotions filled from within and includes no laterals. The cumulative replacement demand for 5 years in the selected scientist, engineer, and professional fields exceeds the capability of the supporting apprentice levels to supply personnel. In fact, the cumulative downward demand over just a 1-year period exceeds the capability of the supporting apprentice levels to provide replacements. This indicates that personnel in journeyman levels and above are constantly being recruited from outside the Corps in order to satisfy demand. Of exceptional note is the combined Occupational Series 801 (general engineering and architecture) of which there are 254 in the Corps but only 3 below GS-11. This highlights not only the apprentice-level inadequacy but also the openness of the upper levels of the Corps to selective filling from outside sources.

CUMULATIVE TURNOVER OF CORPS PERSONNEL

SCIENTIST, ENGINEER, and OTHER PROFESSIONALS



CIVIL ENGINEERS

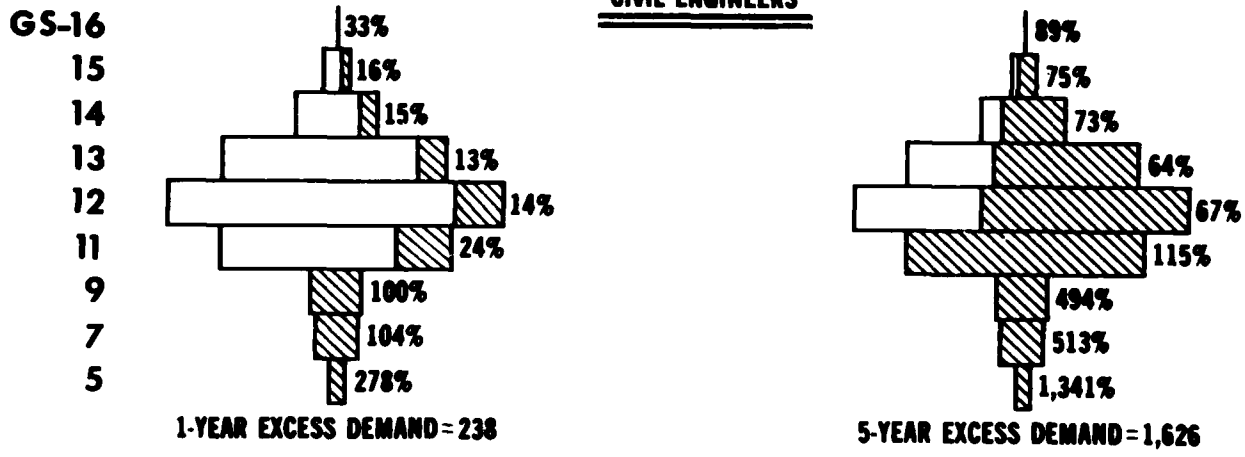


Figure 9

10. Personnel Entering the Corps. A random sampling of Corps employees[10/] in grades GS-11 and above confirmed that it is common to enter the Corps in grades above GS-9. Figure 10 shows that more than 40 percent entered in grade GS-9 or above and that more than one-fourth came on board as professionals in grade GS-11 and above. The demonstrated tendency to enter above apprentice level is accentuated when the sample is reduced to those who have come on board after 1974. This substantiates the situation depicted by the preceding discussion of Corps losses and reflects that the Corps is relying less on apprentice-level recruiting and emphasizing journeyman recruitment.

10/ Department of the Army, Office of the Chief of Engineers, United States Army Engineer Studies Center, Corps Work Force Mobility. Washington, D.C., August 1979.

ENTRY GRADE FOR CORPS CAREERISTS

SAMPLE SIZE: 638 (CURRENTLY GS-11 and ABOVE)

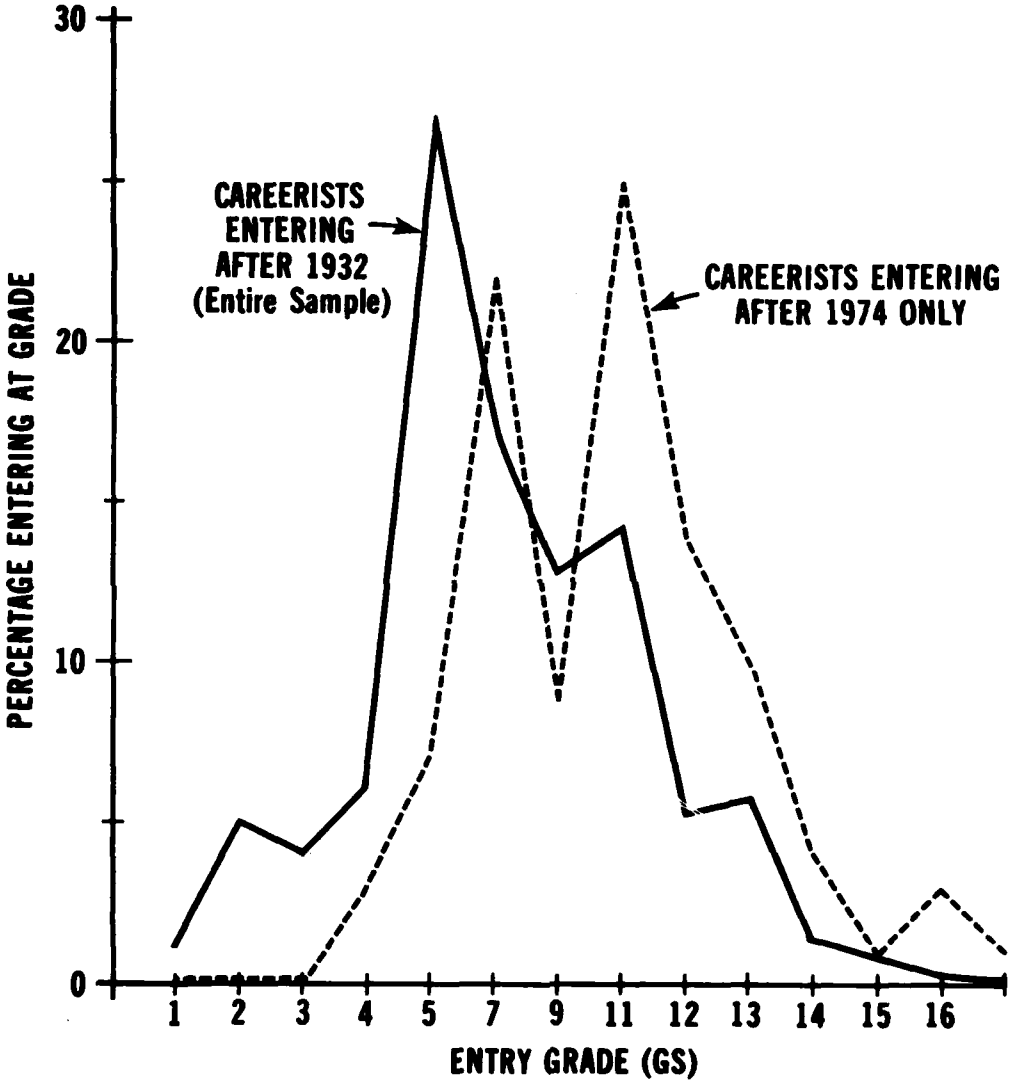


Figure 10

IV. SUMMARY AND EVALUATION

11. MIS Implications. This analysis has highlighted the difficulty involved in discerning the actual capabilities of the Corps work force. Current MIS capabilities do not provide the kind of information needed at the corporate level for planning recruitment, employee development, organizational adjustments, and manpower requirements for new programs.

a. Lower level initiatives. There have been a number of analyses of information technology conducted within the Corps and they have been very beneficial. Most, however, have centered on computer applications and programs and were designed to improve on existing data systems or add additional data displays to existing programs. There has been success at lower levels through programs in divisions and districts such as the Military Information Decision and Analysis System (MIDAS) (Fort Worth) and the Automated Military Construction Progress Reporting System (AMPRS) (Construction Engineering Research Laboratory (CERL)). The challenge now is to consolidate necessary aspects of these gains into a Corps-wide system--one capable of serving corporate management.

b. Corps-wide requirement. Corps progress in implementing the COEMIS system must be standardized. The Finance and Accounting (F&A), Personnel Administration (PA), and Resource Allocation/Program Management (RA/PM) subsystems of the COEMIS are developing and are applicable to Corps automatic data processing uses. The COEMIS-PA subsystem is already functional at most lower and middle management levels. The COEMIS subsystems provide detailed information required by the districts in their daily work that is not available through any other systems. However, the COEMIS is incomplete and is not

universally employed or without shortfalls. It has not been designed to be, and is not, a corporate-level MIS. Lack of universal implementation is a critical defect in the system. This defect compromises extracts from the system such as CORPSTRAT. The Corps should invest in developing the system to the point where work force capabilities and capacities can both be monitored and kept in balance as missions and workload shift. Such a system must be capable of correctly identifying the occupational series and job function within the organizational structure.

12. Personnel Turnover Implications. The impact of the anticipated departure of 25 percent of the Corps work force over the next 5 years has significant management implications. Also, more than 50 percent of the overall work force and over 65 percent of the professional work force (i.e., the 12,471 scientists, engineers, and other professionals) at each grade level will be new in their jobs during the next 5 years. This latter group contains most of the Corps' current supervisory and managerial talent, as well as technical leadership. While the large post-World War II "baby boom" population satisfies the demand for labor in the lower levels of the Corps grade structure, this is not true in the upper levels. The Corps is more likely to have problems finding quality people for leadership positions in the upper grades where demand coincides with the smallest (1940's) age cohorts because there are fewer people from which to choose. Some senior managers in the field are already facing this problem. The implementation of the CSRA, however, provides a mechanism whereby cumulative turnover becomes an opportunity to mold the work force to fit future mission needs. Reviewing job criteria and defining critical job elements for all senior managerial and supervisory positions

should be extended to subordinate managerial and supervisory positions. This would ensure the positions are open to the most outstanding (and qualified) personnel of all occupational series and broaden the experience base from which to select future senior personnel.

13. Employee Development Implications. The personnel turnover examined in this analysis affords a natural evolutionary opportunity to develop the flexibility and work force mix required for future missions. Inherent in such a turnover is a significant requirement for formal and on-the-job training to assist personnel in attaining proficiency in their new jobs and to assure a smooth transition without loss of time on critical missions. Specific training programs can be planned only with more thorough study of individual occupational series and Corps mission requirements. Current work force trends and new mission probabilities indicate some technical and semitechnical fields such as the environmental sciences, hydrology, and contract management which will require growth in the future. In the past, training programs have traditionally aimed at providing engineers with supplemental skills to enable them to work in other fields. This is an expensive and time-consuming practice. The supplemental skills gained through training are not readily available to management since most of these individuals will continue to be identified by their original occupational series. The alternative is to hire additional professionals in these fields and adjust the career opportunity structure to provide them with realistic promotion possibilities. This would be accomplished in conjunction with the CSRA position review. While this is needed in the environmental fields, an area such as hydrological engineering would require a mixed strategy. The universities tend not to teach the specific

hydrological skills needed by the Corps, so developing civil engineers into this field has proven quite satisfactory. However, the problem is that promotion opportunities to the higher grades are very rare and those trained in the field eventually leave it for promotion. Proper management guidance and control of this process--working to correlate employee personal goals with the organization objectives--should result in significant improvements in operational effectiveness.

14. Final Assessment.

a. Corps MIS needed. The Corps MISs are inadequate to provide top management with personnel data needed to support timely decisions and planning. As evidence, an inordinate amount of time was devoted in this study to synthesize and reconcile data inconsistencies. The Corps should devote the effort necessary to achieve a comprehensive decision analysis based MIS that is responsive, functionally oriented, simple and accurate, capable of projecting trends, and compatible across other data bases.

b. CSRA management implications. The CSRA will have a fundamental impact on the future management of the Corps work force. The timing of this Act is particularly opportune in that it coincides with Corps efforts to adapt the work force to future requirements. CSRA provides the mechanism through which Corps managers and supervisors can analyze and redefine jobs and emphasize the skills that must be acquired and maintained. The Corps should vigorously implement the CSRA provisions as a priority matter.

c. Personnel turnover. The Corps should plan for about a 30 percent personnel loss to occur during the next 5 years in its professional work force. During this period, over 65 percent of the personnel at each grade

level will become new in their positions. The excess demand at the lower grade levels will total over 3,400 people. While this situation imposes a significant employee development requirement, it also provides the Corps the opportunity to form a more balanced work force to meet future mission requirements.

d. Skill shortages. New missions, changing technology, and normal attrition will all add to the skill shortage problem in the future. As a result, the Corps faces significant training and recruitment challenges in filling these shortages. The basic question is whether Corps needs can be better accommodated with training and developmental programs for "in-house" resources, or by increasing specialty recruitment and retention. In all likelihood, a combination of programs is best. Sound planning will be required to determine the optimum mix and to ensure adequate implementation for the future.

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ANNEX A

SELECTED OCCUPATIONAL DATA

ANNEX A

SELECTED OCCUPATIONAL DATA

1. Purpose. This annex displays selected occupational data on Corps employees that were found to be of interest during the development of this study. The selection process involved reviewing all occupational series and studying in-depth only those believed to be most critical for specific management attention in the future or as illustrative of current trends and capabilities.

2. Screening Considerations. In extracting information pertaining to Corps personnel from the CIVPERSINS tape, it was necessary to screen selectively since the system lists 47 separate data elements for each employee, not all related to this study. General information topics such as age were extracted and are presented as individual items in Sections I through IV of this monograph. In evaluating functional potential of the Corps, one valuable

indicator for employees is their occupational series code since it is used as the basis for job referral screening. It is instrumental in controlling employee's future advancements because of its intimate relationship with the SKAP characteristics portion of the Army Civilian Career Program for engineers and scientists.

3. Occupational Data Displays. Figures A-1 through A-9 show selected occupational series both within and outside of the engineer and scientist career fields in selected GS grades. Figure A-10 is a Corps-wide summary. The total population presented in these figures accounts for only about 30 percent of the total Corps work force.

SELECTED OCCUPATIONAL DATA FOR GRADE GS-5

Occupational Series	Number	Male (%)	Caucasian (%)
Agricultural Engineer	0	0	0
Chemical Engineer	0	0	0
Civil Engineer	131	86.3	87.8
Electrical Engineer	5	100.0	80.0
Mechanical Engineer	5	100.0	80.0
Geology	43	83.7	97.7
Geophysics	0	0	0
Industrial Engineer	1	0	100.0
Metallurgy	1	100.0	100.0
Materials Engineer	0	0	0
Mining Engineer	0	0	0
Physics	0	0	0
Nuclear Engineer	0	0	0
Environmental Protection Specialist	0	0	0
Oceanography	0	0	0
Hydrology	5	100.0	100.0
OR/SA	1	0	100.0
Safety Engineer	1	100.0	100.0
Sanitation	3	66.7	100.0
Ecology	1	100.0	100.0
Economist	9	66.7	88.9
Facilities Management	0	0	0
Geodesy	0	0	0
Geography	3	33.3	100.0
Industry Property Management	0	0	0
Management Analysis	8	50.0	62.5
Program Analysis	14	35.7	85.7
Personnel Management	4	75.0	75.0
Statistician	0	0	0
Financial Management	0	0	0
Realty	19	26.3	84.2
Contract Representative	1	0	0
Contract and Procurement	14	21.4	92.9
Computer Science and Specialist	13	38.5	84.6
Attorney	0	0	0
Accounting	25	64.0	76.0
Public Information	0	0	0
Petroleum Engineer	0	0	0
Aerospace Engineer	0	0	0
Program Management	0	0	0
Engineer and Architecture Group[a/]	0	0	0

a/ The engineer and architecture group occupational series includes the general engineering series.

Figure A-1

SELECTED OCCUPATIONAL DATA FOR GRADE GS-7

Occupational Series	Number	Male (%)	Caucasian (%)
Agricultural Engineer	0	0	0
Chemical Engineer	0	0	0
Civil Engineer	342	92.1	83.6
Electrical Engineer	19	94.7	84.2
Mechanical Engineer	21	100.0	81.0
Geology	30	90.0	100.0
Geophysics	0	0	0
Industrial Engineer	0	0	0
Metallurgy	0	0	0
Materials Engineer	0	0	0
Mining Engineer	0	0	0
Physics	4	100.0	100.0
Nuclear Engineer	0	0	0
Environmental Protection Specialist	2	100.0	100.0
Oceanography	4	100.0	100.0
Hydrology	7	57.1	100.0
OR/SA	1	100.0	100.0
Safety Engineer	1	100.0	100.0
Sanitation	4	100.0	75.0
Ecology	7	71.4	100.0
Economist	32	78.1	93.8
Facilities Management	2	100.0	100.0
Geodesy	0	0	0
Geography	4	75.0	50.0
Industry Property Management	6	33.3	100.0
Management Analysis	7	57.1	71.4
Program Analysis	14	42.9	78.6
Personnel Management	12	41.7	91.7
Statistician	0	0	0
Financial Management	0	0	0
Realty	43	41.9	79.1
Contract Representative	0	0	0
Contract and Procurement	40	30.0	82.5
Computer Science and Specialist	19	47.4	78.9
Attorney	1	0	100.0
Accounting	54	66.7	75.9
Public Information	0	0	0
Petroleum Engineer	0	0	0
Aerospace Engineer	0	0	0
Program Management	0	0	0
Engineer and Architecture Group[a/]	1	100.0	100.0

a/ The engineer and architecture group occupational series includes the general engineering series.

Figure A-2

SELECTED OCCUPATIONAL DATA FOR GRADE GS-9

Occupational Series	Number	Male (%)	Caucasian (%)
Agricultural Engineer	1	100.0	100.0
Chemical Engineer	1	100.0	100.0
Civil Engineer	353	96.6	84.7
Electrical Engineer	28	100.0	89.3
Mechanical Engineer	20	100.0	85.0
Geology	44	86.4	95.5
Geophysics	0	0	0
Industrial Engineer	0	0	0
Metallurgy	0	0	0
Materials Engineer	1	100.0	100.0
Mining Engineer	0	0	0
Physics	4	100.0	100.0
Nuclear Engineer	0	0	0
Environmental Protection Specialist	1	0	100.0
Oceanography	1	100.0	100.0
Hydrology	7	85.7	85.7
OR/SA	1	0	100.0
Safety Engineer	2	100.0	100.0
Sanitation	7	100.0	85.7
Ecology	6	66.7	100.0
Economist	34	88.2	91.2
Facilities Management	24	95.8	100.0
Geodesy	0	0	0
Geography	5	100.0	100.0
Industry Property Management	10	60.0	70.0
Management Analysis	29	24.1	89.7
Program Analysis	57	35.1	89.5
Personnel Management	17	17.6	82.4
Statistician	1	100.0	100.0
Financial Management	0	0	0
Realty	114	69.3	86.8
Contract Representative	0	0	0
Contract and Procurement	132	42.4	83.3
Computer Science and Specialist	45	68.9	88.9
Attorney	15	80.0	93.3
Accounting	66	63.6	75.8
Public Information	0	0	0
Petroleum Engineer	0	0	0
Aerospace Engineer	0	0	0
Program Management	0	0	0
Engineer and Architecture Group[a/]	2	100.0	100.0

a/ The engineer and architecture group occupational series includes the general engineering series.

Figure A-3

SELECTED OCCUPATIONAL DATA FOR GRADE GS-11

Occupational Series	Number	Male (%)	Caucasian (%)
Agricultural Engineer	0	0	0
Chemical Engineer	0	0	0
Civil Engineer	1,503	98.3	89.2
Electrical Engineer	154	98.1	92.2
Mechanical Engineer	186	100.0	89.2
Geology	85	97.6	96.5
Geophysics	0	0	0
Industrial Engineer	1	100.0	100.0
Metallurgy	1	100.0	100.0
Materials Engineer	1	100.0	100.0
Mining Engineer	0	0	0
Physics	7	100.0	85.7
Nuclear Engineer	0	0	0
Environmental Protection Specialist	0	0	0
Oceanography	12	83.3	100.0
Hydrology	24	95.8	91.7
OR/SA	3	66.7	100.0
Safety Engineer	8	100.0	100.0
Sanitation	31	96.8	96.8
Ecology	10	90.0	100.0
Economist	67	88.1	94.0
Facilities Management	15	100.0	93.3
Geodesy	3	100.0	100.0
Geography	10	80.0	100.0
Industry Property Management	15	93.3	80.0
Management Analysis	59	66.1	91.5
Program Analysis	79	65.8	93.7
Personnel Management	44	25.0	79.5
Statistician	4	100.0	100.0
Financial Management	0	0	0
Realty	231	84.4	94.8
Contract Representative	0	0	0
Contract and Procurement	125	72.0	90.4
Computer Science and Specialist	126	82.5	92.9
Attorney	99	82.8	98.0
Accounting	144	82.6	91.0
Public Information	0	0	0
Petroleum Engineer	0	0	0
Aerospace Engineer	0	0	0
Program Management	0	0	0
Engineer and Architecture Group[a/]	21	100.0	90.5

a/ The engineer and architecture group occupational series includes the general engineering series.

Figure A-4

SELECTED OCCUPATIONAL DATA FOR GRADE GS-12

Occupational Series	Number	Male (%)	Caucasian (%)
Agricultural Engineer	1	0	0
Chemical Engineer	3	100.0	100.0
Civil Engineer	2,260	99.7	92.5
Electrical Engineer	217	99.5	92.6
Mechanical Engineer	225	99.6	93.3
Geology	92	98.9	100.0
Geophysics	10	100.0	90.0
Industrial Engineer	2	50.0	50.0
Metallurgy	1	100.0	100.0
Materials Engineer	4	100.0	75.0
Mining Engineer	0	0	0
Physics	23	100.0	100.0
Nuclear Engineer	2	100.0	100.0
Environmental Protection Specialist	0	0	0
Oceanography	12	100.0	100.0
Hydrology	11	100.0	100.0
OR/SA	11	81.8	90.9
Safety Engineer	25	100.0	96.0
Sanitation	58	98.3	94.8
Ecology	7	100.0	100.0
Economist	72	94.4	91.7
Facilities Management	3	100.0	100.0
Geodesy	2	100.0	100.0
Geography	12	83.3	100.0
Industry Property Management	9	88.9	77.8
Management Analysis	68	92.6	91.2
Program Analysis	40	77.5	87.5
Personnel Management	33	75.8	93.9
Statistician	3	100.0	100.0
Financial Management	1	0	100.0
Realty	117	94.9	91.5
Contract Representative	0	0	0
Contract and Procurement	79	86.1	91.1
Computer Science and Specialist	96	90.6	90.6
Attorney	134	89.6	96.3
Accounting	122	92.6	98.4
Public Information	0	0	0
Petroleum Engineer	0	0	0
Aerospace Engineer	0	0	0
Program Management	0	0	0
Engineer and Architecture Group[a/]	89	100.0	87.6

a/ The engineer and architecture group occupational series includes the general engineering series.

Figure A-5

SELECTED OCCUPATIONAL DATA FOR GRADE GS-13

Occupational Series	Number	Male (%)	Caucasian (%)
Agricultural Engineer	0	0	0
Chemical Engineer	2	100.0	50.0
Civil Engineer	1,491	99.7	95.5
Electrical Engineer	106	100.0	94.3
Mechanical Engineer	105	100.0	95.2
Geology	52	100.0	100.0
Geophysics	1	100.0	100.0
Industrial Engineer	2	100.0	100.0
Metallurgy	0	0	0
Materials Engineer	3	100.0	100.0
Mining Engineer	1	100.0	100.0
Physics	12	100.0	91.7
Nuclear Engineer	0	0	0
Environmental Protection Specialist	0	0	0
Oceanography	1	100.0	100.0
Hydrology	1	100.0	100.0
OR/SA	10	100.0	90.0
Safety Engineer	13	100.0	100.0
Sanitation	33	100.0	93.9
Ecology	0	0	0
Economist	50	94.0	94.0
Facilities Management	0	0	0
Geodesy	1	100.0	100.0
Geography	10	100.0	100.0
Industry Property Management	2	100.0	100.0
Management Analysis	24	87.5	91.7
Program Analysis	21	90.5	100.0
Personnel Management	46	87.0	95.7
Statistician	1	100.0	100.0
Financial Management	39	94.9	92.3
Realty	73	98.6	97.3
Contract and Representative	0	0	0
Contract Procurement	32	93.8	96.9
Computer Science and Specialist	39	94.9	94.9
Attorney	56	94.6	100.0
Accounting	39	100.0	94.9
Public Information	0	0	0
Petroleum Engineer	0	0	0
Aerospace Engineer	0	0	0
Program Management	0	0	0
Engineer and Architecture Group[a/]	76	100.0	93.4

a/ The engineer and architecture group occupational series includes the general engineering series.

Figure A-6

SELECTED OCCUPATIONAL DATA FOR GRADE GS-14

Occupational Series	Number	Male (%)	Caucasian (%)
Agricultural Engineer	0	0	0
Chemical Engineer	1	100.0	100.0
Civil Engineer	589	100.0	95.9
Electrical Engineer	22	100.0	95.5
Mechanical Engineer	20	100.0	90.0
Geology	18	94.4	100.0
Geophysics	1	100.0	100.0
Industrial Engineer	0	0	0
Metallurgy	2	100.0	50.0
Materials Engineer	0	0	0
Mining Engineer	0	0	0
Physics	9	100.0	88.9
Nuclear Engineer	2	100.0	100.0
Environmental Protection Specialist	0	0	0
Oceanography	3	100.0	100.0
Hydrology	2	100.0	100.0
OR/SA	7	100.0	100.0
Safety Engineer	6	100.0	100.0
Sanitation	4	100.0	100.0
Ecology	0	0	0
Economist	20	95.0	85.0
Facilities Management	0	0	0
Geodesy	1	100.0	0
Geography	7	100.0	100.0
Industry Property Management	0	0	0
Management Analysis	4	100.0	100.0
Program Analysis	4	100.0	100.0
Personnel Management	15	93.3	86.7
Statistician	1	100.0	100.0
Financial Management	18	100.0	94.4
Realty	33	93.9	100.0
Contract Representative	0	0	0
Contract and Procurement	7	85.7	100.0
Computer Science and Specialist	6	100.0	100.0
Attorney	61	98.4	100.0
Accounting	3	100.0	100.0
Public Information	0	0	0
Petroleum Engineer	0	0	0
Aerospace Engineer	0	0	0
Program Management	0	0	0
Engineer and Architecture Group[a/]	36	100.0	100.0

a/ The engineer and architecture group occupational series includes the general engineering series.

Figure A-7

SELECTED OCCUPATIONAL DATA FOR GRADE GS-15

Occupational Series	Number	Male (%)	Caucasian (%)
Agricultural Engineer	0	0	0
Chemical Engineer	0	0	0
Civil Engineer	188	100.0	96.3
Electrical Engineer	2	100.0	100.0
Mechanical Engineer	2	100.0	100.0
Geology	3	100.0	100.0
Geophysics	0	0	0
Industrial Engineer	0	0	0
Metallurgy	0	0	0
Materials Engineer	0	0	0
Mining Engineer	0	0	0
Physics	2	100.0	100.0
Nuclear Engineer	0	0	0
Environmental Protection Specialist	0	0	0
Oceanography	1	100.0	100.0
Hydrology	0	0	0
OR/SA	1	100.0	100.0
Safety Engineer	0	0	0
Sanitation	0	0	0
Ecology	0	0	0
Economist	7	100.0	100.0
Facilities Management	0	0	0
Geodesy	0	0	0
Geography	3	100.0	100.0
Industry Property Management	0	0	0
Management Analysis	2	100.0	100.0
Program Analysis	1	100.0	100.0
Personnel Management	2	100.0	100.0
Statistician	0	0	0
Financial Management	2	100.0	100.0
Realty	8	100.0	100.0
Contract Representative	0	0	0
Contract and Procurement	1	100.0	100.0
Computer Science and Specialist	1	100.0	100.0
Attorney	26	96.2	92.3
Accounting	1	100.0	100.0
Public Information	0	0	0
Petroleum Engineer	0	0	0
Aerospace Engineer	0	0	0
Program Management	0	0	0
Engineer and Architecture Group[a/]	22	100.0	90.9

a/ The engineer and architecture group occupational series includes the general engineering series.

Figure A-8

SELECTED OCCUPATIONAL DATA FOR GRADE GS-16

Occupational Series	Number	Male (%)	Caucasian (%)
Agricultural Engineer	0	0	0
Chemical Engineer	0	0	0
Civil Engineer	18	100.0	94.4
Electrical Engineer	0	0	0
Mechanical Engineer	0	0	0
Geology	0	0	0
Geophysics	0	0	0
Industrial Engineer	0	0	0
Metallurgy	0	0	0
Materials Engineer	0	0	0
Mining Engineer	0	0	0
Physics	0	0	0
Nuclear Engineer	0	0	0
Environmental Protection Specialist	0	0	0
Oceanography	0	0	0
Hydrology	0	0	0
OR/SA	1	100.0	100.0
Safety Engineer	0	0	0
Sanitation	0	0	0
Ecology	0	0	0
Economist	0	0	0
Facilities Management	0	0	0
Geodesy	0	0	0
Geography	0	0	0
Industry Property Management	0	0	0
Management Analysis	0	0	0
Program Analysis	0	0	0
Personnel Management	1	100.0	100.0
Statistician	0	0	0
Financial Management	0	0	0
Realty	0	0	0
Contract Representative	0	0	0
Contract and Procurement	0	0	0
Computer Science and Specialist	0	0	0
Attorney	2	50.0	100.0
Accounting	0	0	0
Public Information	0	0	0
Petroleum Engineer	0	0	0
Aerospace Engineer	0	0	0
Program Management	0	0	0
Engineer and Architecture Group[a/]	6	100.0	100.0

a/ The engineer and architecture group occupational series includes the general engineering series.

Figure A-9

SELECTED OCCUPATIONAL DATA SUMMARY CORPS-WIDE

Occupational Series	Number	Male (%)	Caucasian (%)
Agricultural Engineer	2	100.0	100.0
Chemical Engineer	7	100.0	85.7
Civil Engineer	6,877	98.6	91.9
Electrical Engineer	553	99.o	92.4
Mechanical Engineer	584	99.8	91.4
Geology	367	94.6	98.4
Geophysics	12	100.0	91.7
Industrial Engineer	6	66.7	83.3
Metallurgy	5	100.0	80.0
Materials Engineer	9	100.0	88.9
Mining Engineer	1	100.0	100.0
Physics	61	100.0	95.o
Nuclear Engineer	4	100.0	100.0
Environmental Protection Specialist	3	66.7	100.0
Oceanography	34	94.1	100.0
Hydrology	57	91.2	94.7
OR/SA	36	86.1	94.4
Safety Engineer	56	100.0	98.2
Sanitation	140	97.9	94.3
Ecology	31	83.9	100.0
Economist	291	89.7	92.4
Facilities Management	45	97.8	97.8
Geodesy	7	100.0	85.7
Geography	55	87.3	96.4
Industry Property Management	47	76.6	80.9
Management Analysis	202	71.8	89.1
Program Analysis	236	59.7	90.7
Personnel Management	176	59.1	88.1
Statistician	10	100.0	100.0
Financial Management	60	95.0	93.3
Realty	643	81.3	92.1
Contract Representative	2	0	50.0
Contract and Procurement	435	61.8	87.8
Computer Science and Specialist	347	81.3	90.8
Attorney	395	89.6	97.5
Accounting	456	81.4	88.6
Public Information	0	0	0
Petroleum Engineer	0	0	0
Aerospace Engineer	0	0	0
Program Management	0	0	0
Engineer and Architecture Group[a/]	254	100.0	92.1

a/ The engineer and architecture group occupational series includes the general engineering series.

Figure A-10

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